

1. An apparatus for polishing a substrate comprising:

a rotary polishing platen having an upper surface:

a polishing pad fixedly attached to said upper surface;

a polishing slurry containing a mechanical abrasive deposited on said
5 upper surface of said polishing pad;

a rotary polishing head assembly having a shallow recessed face

adapted to centrally hold the upper back edge of said substrate, said

recessed face is oriented substantially parallel to said upper surface of
said polishing platen;

10 said polishing head assembly has a rotating axis offset relative
to the rotary axis of said polishing platen;

a non-rotary cylindrical actuator assembly, having a bottom surface, is
coaxially oriented about the outer edge of said polishing head assembly;

a ditched ring removably attached to said bottom surface of said
15 cylindrical actuator assembly.

2. The apparatus of claim 1, wherein said cylindrical actuator
assembly is vertically floatable with respect to said rotatable polishing head
assembly.

3. The apparatus of claim 1, wherein said ditched ring further comprises:

a bottom section of a reduced wall thickness of approximately 5 mm;

a multiplicity of conduit grooves formed in said bottom section of ditched
ring permitting a boundary layer of abrasive slurry to flow unimpeded to
25 a rotating substrate ;

said conduit grooves formed in pairs, each groove formed on either side
of a center coordinate axis of said ditched ring;

said conduit grooves pairs are radially concentric and developed from a point outside of said ditched ring on said center axis;

30 said center coordinate axis of said conduit grooves is coincident with rotatable axis of the polishing platen.

4. The apparatus of claim 2 wherein said conduit grooves are substantially 0.4 mm wide.

35 5. The apparatus of claim 2 wherein said conduit grooves are radially concentric with a spacing between of approximately 20 mm.

40 6. The apparatus of claim 1 wherein said reduced wall thickness at the bottom of said ditched ring is configured to displace wrinkles from the outer edge of said substrate to the outer periphery of the ditched ring.

45 7. The apparatus of claim 2 wherein said radially concentric conduit grooves form radial tracks of a metered volume of abrasive slurry on surface of said polishing pad;

8. The apparatus of claim 1 wherein the use of said ditched ring during chemical mechanical polishing of substrates uniformly removes microscratches.

50 9. A method for polishing a semiconductor wafer comprising the steps of: providing a chemical mechanical polishing apparatus having a rotary polishing platen with a polishing pad fixedly attached to its upper surface, and

55 a polishing slurry containing a mechanical abrasive dispensed on said
upper surface of said polishing pad, and
a rotary polishing head assembly having a shallow recessed face
adapted to centrally hold the upper back edge of said semiconductor
wafer, said recessed face is oriented substantially parallel to said upper
surface of said polishing platen;
60 said rotatable polishing head assembly positionally offset relative to
said rotating polishing platen, and
providing a non-rotary cylindrical actuator assembly having a bottom
surface that is coaxially oriented about an outer edge of said polishing
head assembly;
65 removably attaching a ditched ring to the bottom surface of said
cylindrical actuator assembly.

10. The method of claim 9, wherein said cylindrical actuator assembly is
vertically floatable with respect to said polishing head assembly.

70 11. The method of claim 9, wherein said ditched ring further comprises:
a bottom section of a reduced wall thickness of approximately 5 mm;
a multiplicity of conduit grooves formed in said bottom section of ditched
ring permitting a boundary layer of abrasive slurry to travel unimpeded to
75 a rotating semiconductor wafer;
said conduit grooves formed in pairs, each groove formed on either side
of a center coordinate axis of said ditched ring;
said conduit grooves pairs are radially concentric and developed from a
point outside of said ditched ring on said center axis;

80 said center coordinate axis of said conduit grooves is coincident with
rotatable axis of the polishing platen.

12. The method of claim 11 wherein said conduit grooves are substantially
0.4 mm wide.

85

13. The method of claim 11 wherein said conduit grooves are radially
concentric with a spacing between of approximately 20 mm.

90

14. The method of claim 9 wherein said reduced wall thickness at the
bottom of said ditched ring is configured to displace wrinkles from the outer edge
of said semiconductor wafer to the outer periphery of the ditched ring.

95

15. The apparatus of claim 11 wherein said radially concentric conduit
grooves form radial tracks of a metered volume of abrasive slurry on surface of
said polishing pad;

16. The method of claim 9 wherein the use of said ditched ring during
chemical mechanical polishing of wafers uniformly removes microscratches.